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USAF OCCUPATIONAL ILLNESS ANNUAL SUMMARY FY 1990

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OCCUPATIONAL AND ENVIRONMENTAL
HEALTH DIRECTORATE
Brooks Air Force Base, Texas 78235-5000

March 1991

Final Technical Report for Period Fiscal Year 1990

AIR FORCE SYSTEMS COMMAND
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This report summarizes occupational illness reports for fiscal year 1990 in extensive detail. Historical data, covering fiscal years 1986 through 1989 are included for comparison. Abstracted data from special epidemiological studies using USAF occupational illness data are presented. An analysis of current trends is included in the discussion.

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I. INTRODUCTION

A. This publication contains summary tables of data taken from the Occupational Illness Data Registry (OIDR) on the occurrence of reported occupational illnesses in the United States Air Force.

B. Part III contains information reported for FY 1990. The tables show the number of cases reported to the OIDR, as well as the distribution of cases by major command, personnel category, occupation code, and OSHA reporting code.

C. Part IV contains tables showing the number of cases reported to the OIDR by fiscal year for the period 1986 - 1990.

D. Part V includes graphs of selected summary data.

E. Part VI summarizes selected epidemiological studies performed with OIDR data during the past year.

F. Part VII presents a discussion of occupational illness reporting and a trend analysis of selected OIDR data.

G. The health surveillance process is a loop that begins in the field, but often doesn't end there. This publication represents the first attempt to close that gap for occupational health. A word of caution is advisable. Over interpretation of the data is possible and not necessarily helpful. Rate comparisons in particular are difficult to interpret, since population at risk figures are hard to obtain. It is possible to find denominator data for some populations, such as a particular base, MAJCOM, or AFSC. The problem with these data is that they don't represent a population at risk based upon exposure to a given agent. Therefore, most of the data seen in this report will consist of proportional comparisons, which match observed totals with those expected, based upon some reference population. Although not as informative as a rate or risk, proportional ratios are useful. They also require no denominator. Finally, recognize that this data only represents cases reported to the OIDR. Several independent estimates of occupational illness underreporting in the Air Force indicate that only ten to fifteen percent of cases are ever recorded.

II. BACKGROUND INFORMATION

A. Occupational illness reporting in the Air Force serves two purposes. It satisfies federal law, and it is the foundation of a health surveillance system which can guide an informed decision making process.

1. The requirements to report occupational illness can be found in AFR 127-4, Investigating and Reporting USAF Mishaps; AFR 161-33, The Aerospace Medical Program; and, AFR 168-4, Administration of Medical Activities. These

Note: This report was accomplished by the Air Force Occupational and Environmental Health Laboratory (AFOEHL) which is now the Armstrong Laboratory, Occupational and Environmental Health Directorate.

Air Force directives are in turn driven by OSHA standards, as written in the Code of Federal Regulations, volume 29, section 1904.

2. The OIDR was established in response to Air Staff directive. This past fiscal year, bases began sending AF Forms 190, Occupational Illness/Injury Report, to the Air Force Occupational and Environmental Health Laboratory (AFOEHL)/EHO, Brooks AFB, as instructed by a HQ USAF/SGP letter, dated 6 Sep 89.

B. Beyond meeting reporting requirements, there are several reasons for collecting occupational health data. One is to locate and follow workers exposed to potentially harmful agents. The second is to discover previously unrecognized associations between workers, their environment, and disease. The vast majority of health surveillance systems depend upon passively acquired information, such as employee compensation records, to perform these functions. The problem with these figures is that they are collected for some other purpose and seldom fulfill expectations. The OIDR on the other hand is an active surveillance system. Data is specifically collected to meet its needs. It goes well beyond other systems in that its focus is on the individual. What was their occupation? Their exposure? Their illness? These are questions the OIDR can answer. Most base level programs will not record enough cases to accurately forecast trends. By pooling data from every base at the MAJCOM and Air Force level, trends should become visible. The trick is to take this information, couple it with environmental data, and use it to apply interventions, when and where they are needed. We can supply the trends, profiling the ill worker in the classic epidemiologic terms of time, place, and person. You will have to integrate this data with information from the workplace in order to effectively manage your occupational health programs. This information should allow you to prioritize surveillance, intervention, and preventive actions. The outcome should be a more effective, efficient program; a significant accomplishment considering the strain being placed upon our resources.

C. In organizing this data, it became apparent that several cohorts were present. Military and civilian are the most obvious ones. MAJCOMs are another. Throughout this paper cohort analysis will be attempted. However, in many cases the cohorts are too small to make analysis useful.

III. REPORTED OCCUPATIONAL ILLNESSES, FY 1990

Tables one through six show the number of cases reported to the OIDR, as well as the distribution of cases by major command, personnel category, occupational code, and OSHA reporting code.

Table 1. Reported Occupational Illnesses by Major Command, FY 1990.

MAJCOM	Civilian			Military			Total		
	Reported	Population	Cases/1000	Reported	Population	Cases/1000	Reported	Population	Cases/1000
Alaskan Air Command (AAC)	12	1,222	9.82	1	7,468	0.13	13	8,690	2.88
Air Force Logistics Command (AFLC)	318	84,449	3.77	11	11,998	0.92	329	96,447	3.41
Air Force Reserve (AFRES)	6	13,200	0.45	1	60,069	0.02	7	73,269	0.1
Air Force Systems Command (AFSC)	8	28,753	0.28	60	23,746	2.53	68	53,499	1.29
Air National Guard (ANG)	8	24,310	0.33	8	116,000	0.17	16	140,310	0.11
Air Training Command (ATC)	27	12,840	2.11	7	59,911	0.12	34	72,751	0.47
Air University (AU)	0	1,562	0	1	5,623	0.18	1	7,184	0.14
Military Airlift Command (MAC)	13	15,022	0.87	15	75,195	0.2	28	90,217	0.31
Pacific Air Forces (PACAF)	5	9,742	0.51	10	28,413	0.35	15	38,155	0.39
Strategic Air Command (SAC)	21	12,264	1.71	48	103,026	0.47	69	115,290	0.6
Air Force Space Command (SPACE)	4	1,794	2.23	0	6,192	0	4	7,986	0.5
Tactical Air Command (TAC)	16	11,562	1.3	36	94,133	0.38	51	105,695	0.48
USAF Academy (USAFA)	2	1,578	1.27	0	2,704	0	2	4,282	0.47
US Air Force in Europe (USAFE)	3	9,982	0.3	5	60,471	0.08	8	70,453	0.11
	442	190,760	2.32	203	594,889	0.35	645	785,649	0.82

Table 2. Reported Occupational Illnesses by Civilian Occupation Code, FY 1990.

Code	Utilization Field Title	Total	Percent
0318 – 2091	Administrative – Clerical	47	10.6
2604	Electronics Mechanic	3	0.7
2854	Electronic Equipment Repair	5	1.1
2892	Aircraft Electrical Instrument Repairer	4	0.9
3414 – 3416	Machinist – Toolmaker	7	1.6
3806	Sheetmetal Mechanic	36	8.1
4102	Painter	9	2
4201 – 4204	Pipefitter	3	0.7
4352	Plastics Fabricator	4	0.9
4848	Mechanical Parts Repairer	5	1.1
5306 – 5414	Air Conditioning, Boiler Operator	6	1.4
6901 – 6910	Warehouseman	8	1.8
7009	Equipment Cleaner	4	0.9
8255	Pneudraulic Mechanic	8	1.8
8602	Aircraft Engine Mechanic	3	0.7
8852	Aircraft Mechanic	13	2.9
	Unknown or Unspecified	277	62.7

Table 3. Reported Civilian Occupational Illnesses by Occupation Code and OSHA Code, FY 1990.

Occupation Code	Utilization Field Title	21-Skin Disorders	22-Dust Disease of Lungs	23-Respiratory Toxicity	24-Systemic Toxicity	25-Effects of Physical Agents	26-Repetitive Trauma	29-Other Disorders	Total
0318 – 2091	Administrative – Clerical	4	0	3	3	2	12	23	47
2604	Electronics Mechanic	0	0	2	1	0	0	0	3
2854	Electronic Equipment Repair	0	0	0	0	0	5	0	5
2892	Aircraft Electrical Instrument Repairer	0	0	1	0	0	3	0	4
3414 – 3416	Machinist – Toolmaker	3	0	0	0	0	4	0	7
3806	Sheetmetal Mechanic	2	0	1	1	1	27	4	36
4102	Painter	4	0	1	1	0	1	2	9
4201 – 4204	Pipefitter	1	0	1	1	0	0	0	3
4352	Plastics Fabricator	3	0	0	1	0	0	0	4
4848	Mechanical Parts Repairer	1	0	0	0	0	5	0	6
5306 – 5414	Air Conditioning, Boiler Operator	1	0	1	0	0	3	1	6
6901 – 6910	Warehouseman	1	0	0	1	0	1	5	8
7009	Equipment Cleaner	0	0	0	2	0	0	2	4
8255	Pneudraulic Mechanic	0	0	1	1	0	6	0	8
8602	Aircraft Engine Mechanic	2	0	0	0	0	1	0	3
8852	Aircraft Mechanic	2	0	2	0	0	8	1	13
	Unknown or Unspecified	46	4	31	34	12	113	36	276
		70	4	44	46	15	189	74	442

Table 4. Reported Military Occupational Illnesses by Occupation Code, FY 1990.

Code	Utilization Field Title	Total	Assigned	Cases/1000
Officer				
05	Disaster Preparedness	1	167	6.00
15	Navigator	1	8,375	0.10
97	Nurse	2	5,408	0.40
Enlisted				
11	Aircrew Operations	1	8,853	0.10
12	Aircrew Protection	1	2,804	0.70
23	Visual Information	1	2,722	0.40
27	Command Control Systems Ops	2	16,287	0.10
31	Instrumentation	1	525	1.90
32	Precision Maintenance	1	2,647	0.40
41	Missle Systems Maintenance	1	5,038	0.20
45	Manned Aerospace Maintenance	46	103,255	0.45
46	Munitions & Weapons	13	25,016	0.50
47	Vehicle Maintenance	4	5,550	0.70
49	Communications/Computers	1	20,386	0.05
54	Mechanical/Electrical	11	10,033	1.10
55	Structures/Pavements	13	11,819	1.10
56	Sanitation	7	1,624	4.30
57	Fire Protection	30	6,112	4.90
60	Transportation	1	13,403	0.07
62	Services	2	6,283	0.30
63	Fuels	2	6,599	0.30
64	Supply	1	23,708	0.00
67	Financial	1	5,583	0.20
70	Information Management	3	21,471	0.14
73	Personnel	3	13,849	0.22
74	Morale, Welfare & Recreation	1	1,723	0.60
81	Security Police	5	37,884	0.10
82	Special Investigations	2	933	2.10
87	Band	1	1,129	0.90
90	Medical	3	25,492	0.18
98	Dental	4	3,581	1.12
	Unknown	38		

Table 5. Reported Military Occupational Illnesses by Occupation Code and OSHA Code, FY 1990.

Occupation Code	Utilization Field Title	21-Skin Disorders	22-Dust Disease of Lungs	23-Respiratory Disorders	24-Systemic Toxicity	25-Disorders Due to Physical Agents	26-Repetitive Trauma	29-Other Disorders	Total
OFFICER									
05	Disaster Preparedness	0	0	0	0	1	0	0	1
ENLISTED									
15	Navigator	0	0	0	0	1	0	0	1
97	Nurse	2	0	0	0	0	0	0	2
11	Aircrew Operations	0	0	0	1	0	0	0	2
12	Aircrew Protection	0	0	0	0	0	0	1	1
23	Visual Information	0	0	0	0	1	0	0	1
27	Command Control Systems Ops	1	0	0	0	1	0	0	2
31	Instrumentation	1	0	0	0	0	0	0	1
32	Precision Maintenance	1	0	0	0	0	0	0	1
41	Missle Systems Maintenance	1	0	0	0	0	0	0	1
45	Manned Aerospace Maintenance	21	0	12	6	9	3	0	46
46	Munitions & Weapons	3	0	1	4	2	2	1	13
47	Vehicle Maintenance	2	0	1	0	0	0	1	4
49	Communications/Computers	0	0	0	0	1	0	0	1
54	Mechanical/Electrical	0	0	0	0	11	0	0	11
55	Structures/Pavements	4	0	1	3	3	1	0	13
56	Sanitation	1	0	1	0	3	0	0	7
57	Fire Protection	0	0	0	0	28	0	0	30
60	Transportation	0	0	1	0	0	0	0	1
62	Services	0	0	0	0	2	0	0	2
63	Fuels	0	0	1	0	1	0	0	2
64	Supply	0	0	0	0	1	0	0	1
67	Financial	0	0	1	0	0	0	0	1
70	Information Management	0	0	0	0	3	0	0	3
73	Personnel	0	0	0	0	2	0	0	3
74	Morale, Welfare & Recreation	0	0	0	0	1	0	0	1
81	Security Police	0	0	2	3	0	0	0	5
82	Special Investigations	0	0	0	0	2	0	0	2
87	Band	1	0	0	0	0	1	0	1
90	Medical	1	0	1	0	0	0	1	3
98	Dental	2	0	1	0	1	0	0	4
	Unknown	28	0	8	9	1	3	5	38
		49	0	31	27	74	11	11	203

Table 6. Reported Cases Ranked by ICD-9 Code, FY 1990.

ICD-9 Code	ICD-9 Code Description	Total	Percent
Civilian			
987.	Toxic effects of other gases ...	72	16.3
692.	Contact dermatitis and other eczema	64	14.5
354.	Mononeuritis of upper limb	58	13.1
388.	Other disorders of ear	57	12.9
726.	Peripheral enthesopathies	31	7.2
300.	Neurotic disorders	24	5.6
727.	Other disorders of synovia, tendons ...	12	2.8
729.	Other disorders of soft tissues	10	2.3
719.	Other/unspecified joint disorders	8	1.9
722.	Intervertebral disk disorders	6	1.4
506.	Respiratory cond. due to chemicals	6	1.4
Other		94	21.0
Military			
992.	Effects of heat and light	67	33.0
987.	Toxic effects of other gases ...	52	25.6
692.	Contact dermatitis and other eczema	46	22.7
354.	Mononeuritis of upper limb	5	2.5
388.	Other disorders of ear	5	2.5
991.	Effects of reduced temperature	3	1.5
05_.	Infectious diseases	2	1.0
276.	Volume depletion	2	1.0
506.	Respiratory cond. due to chemicals	2	1.0
980.	Toxic effects of alcohols	2	1.0
Other		17	8.4

IV. HISTORICAL SUMMARY TABLES COVERING FY 1986 - FY 1990.

Tables seven through 29 show the number of cases reported to the OIDR, as well as the distribution of cases by major command, personnel category, occupational code, and OSHA reporting code.

Table 7. Reported Occupational Illnesses by FY and Personnel Component.

Fiscal Year	Civilian		Military		All	
	Total	Percent Change	Total	Percent Change	Total	Percent Change
1986	13		8		21	
1987	147	1030	137	1612	284	1252
1988	237	61	158	15	395	39
1989	281	19	117	−26	398	1
1990	442	57	203	74	645	62
	1020		623		1743	

Table 8. Reported Occupational Illness by FY, MAJCOM, and Personnel Component.

MAJCOM	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
AAC	12	1	0	4	3	0	7	0	0	0	22	5
AFLC	318	11	171	5	123	1	53	3	6	0	671	20
AFRES	6	1	0	0	0	0	1	0	0	0	7	1
AFSC	8	60	6	10	4	11	1	3	0	0	19	84
ANG	8	8	9	2	10	1	2	2	0	0	29	13
ATC	27	7	11	4	16	6	16	6	0	0	70	23
AU	0	1	0	0	1	1	2	0	0	0	3	2
MAC	13	15	22	16	23	10	16	19	1	0	75	60
PACAF	5	10	15	32	4	68	5	9	1	0	30	119
SAC	21	48	22	6	30	17	23	61	3	8	99	140
SPACE	4	0	0	1	2	0	2	0	0	0	8	1
TAC	15	36	23	34	19	40	15	26	2	0	74	136
USAFA	2	0	1	1	1	1	4	0	0	0	8	2
USAFE	3	5	1	2	1	2	0	8	0	0	5	17
	442	203	281	117	237	158	147	137	13	8	1,120	623

Table 9. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21–Skin Disorders	70	49	58	21	36	25	35	39	3	2	202	136
22–Dust Disease of the Lungs	4	0	4	0	6	0	3	0	2	0	19	0
23–Respiratory Disorders	44	31	31	16	33	18	15	28	0	1	123	94
24–Systemic Toxicity	46	27	37	24	11	26	28	34	3	1	125	112
25–Disorders due to Physical Agents	15	74	5	47	7	80	5	21	0	0	32	222
26–Repetitive Trauma	189	11	123	2	117	2	48	10	4	4	481	29
29–Other Disorders	74	11	23	7	27	7	13	5	1	0	138	30
	442	203	281	117	237	158	147	137	13	8	1,120	623

Table 10. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for AAC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	1	1	0	0	1	0	0	0	0	0	2	1
22-Dust Disease of the Lungs	0	0	0	0	0	0	1	0	0	0	1	0
23-Respiratory Disorders	0	0	0	0	2	0	1	0	0	0	3	0
24-Systemic Toxicity	6	0	0	2	0	0	4	0	0	0	10	2
25-Disorders due to Physical Agents	0	0	0	2	0	0	0	0	0	0	0	2
26-Repetitive Trauma	6	0	0	0	0	0	1	0	0	0	6	0
29-Other Disorders	0	0	0	0	0	0	0	0	0	0	0	0
	12	1	0	4	3	0	7	0	0	0	22	5

Table 11. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for AFLC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	53	4	39	5	19	1	23	1	2	0	136	11
22-Dust Disease of the Lungs	0	0	2	0	2	0	0	0	0	0	4	0
23-Respiratory Disorders	29	0	15	0	11	0	11	0	0	0	66	0
24-Systemic Toxicity	31	4	17	0	7	0	6	1	1	0	62	5
25-Disorders due to Physical Agents	7	0	1	0	4	0	0	0	0	0	12	0
26-Repetitive Trauma	141	2	89	0	71	0	12	1	3	0	316	3
29-Other Disorders	57	1	8	0	9	0	1	0	0	0	75	1
	318	11	171	5	123	1	53	3	6	0	671	20

Table 12. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for AFRES.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	2	0	0	0	0	0	1	0	0	0	3	0
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	0	0	0	0	0	0	0	0	0	0	0	0
24-Systemic Toxicity	0	1	0	0	0	0	0	0	0	0	0	1
25-Disorders due to Physical Agents	0	0	0	0	0	0	0	0	0	0	0	0
26-Repetitive Trauma	3	0	0	0	0	0	0	0	0	0	3	0
29-Other Disorders	1	0	0	0	0	0	0	0	0	0	1	0
	6	1	0	0	0	0	1	0	0	0	7	1

Table 13. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for AFSC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	1	7	2	5	1	5	0	2	0	0	4	19
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	0	6	1	0	1	0	0	0	0	0	2	6
24-Systemic Toxicity	4	5	0	1	0	2	0	0	0	0	4	8
25-Disorders due to Physical Agents	3	40	1	3	1	1	0	1	0	0	5	45
26-Repetitive Trauma	0	1	2	0	0	0	1	0	0	0	3	1
29-Other Disorders	0	1	0	1	1	3	0	0	0	0	1	5
	8	60	6	10	4	11	1	3	0	0	19	84

Table 14. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for ANG.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	3	0	1	0	0	1	1	0	0	0	5	1
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	1	4	2	1	6	0	0	0	0	0	9	5
24-Systemic Toxicity	0	0	4	1	1	0	1	1	0	0	6	2
25-Disorders due to Physical Agents	0	3	0	0	0	0	0	0	0	0	0	3
26-Repetitive Trauma	4	1	1	0	3	0	0	0	0	0	8	1
29-Other Disorders	0	0	1	0	0	0	0	1	0	0	1	1
	8	8	9	2	10	1	2	2	0	0	29	13

Table 15. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for ATC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	1	0	2	0	1	1	4	1	0	0	8	2
22-Dust Disease of the Lungs	4	0	2	0	0	0	0	0	0	0	6	0
23-Respiratory Disorders	5	0	0	1	1	1	0	3	0	0	6	5
24-Systemic Toxicity	2	0	1	1	0	2	2	0	0	0	5	3
25-Disorders due to Physical Agents	1	7	0	2	0	2	0	2	0	0	1	13
26-Repetitive Trauma	9	0	4	0	7	0	6	0	0	0	26	0
29-Other Disorders	5	0	2	0	7	0	5	0	0	0	19	0
	27	7	11	4	16	6	16	6	0	0	70	23

Table 16. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for AU.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	0	0	0	0	0	1	0	0	0	0	0	1
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	0	0	0	0	0	0	0	0	0	0	0	0
24-Systemic Toxicity	0	0	0	0	1	0	0	0	0	0	1	0
25-Disorders due to Physical Agents	0	0	0	0	0	0	0	0	0	0	0	0
26-Repetitive Trauma	0	1	0	0	0	0	1	0	0	0	1	1
29-Other Disorders	0	0	0	0	0	0	1	0	0	0	1	0
	0	1	0	0	1	1	2	0	0	0	3	2

Table 17. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for MAC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	2	1	4	3	4	2	3	5	0	0	13	11
22-Dust Disease of the Lungs	0	0	0	0	1	0	2	0	1	0	4	0
23-Respiratory Disorders	1	4	2	1	1	5	1	3	0	0	5	13
24-Systemic Toxicity	0	2	1	4	1	1	5	9	0	0	7	16
25-Disorders due to Physical Agents	1	7	0	6	1	2	1	0	0	0	3	15
26-Repetitive Trauma	6	1	10	0	12	0	4	1	0	0	32	2
29-Other Disorders	3	0	5	2	3	0	0	1	0	0	11	3
	13	15	22	16	23	10	16	19	1	0	75	60

Table 18. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for PACAF.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	0	5	7	3	0	2	0	4	0	0	7	14
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	1	2	4	1	3	6	0	2	0	0	8	11
24-Systemic Toxicity	0	2	0	4	0	8	0	2	1	0	1	16
25-Disorders due to Physical Agents	0	0	1	24	0	50	0	0	0	0	1	74
26-Repetitive Trauma	3	1	2	0	1	0	3	1	0	0	9	2
29-Other Disorders	1	0	1	0	0	2	2	0	0	0	4	2
	5	10	15	32	4	68	5	9	1	0	30	119

Table 19. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for SAC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	3	17	1	1	4	5	0	17	0	2	8	42
22-Dust Disease of the Lungs	0	0	0	0	2	0	0	0	1	0	3	0
23-Respiratory Disorders	3	11	4	0	7	2	1	15	0	1	15	29
24-Systemic Toxicity	2	7	3	1	0	6	8	13	1	1	14	28
25-Disorders due to Physical Agents	3	5	1	3	1	2	2	7	0	0	7	17
26-Repetitive Trauma	7	3	11	1	12	1	8	6	0	4	38	16
29-Other Disorders	3	5	2	0	4	1	4	3	1	0	14	9
	21	48	22	6	30	17	23	61	3	8	99	140

Table 20. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for SPACE.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21–Skin Disorders	0	0	0	0	0	0	0	0	0	0	0	0
22–Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23–Respiratory Disorders	0	0	0	0	0	0	0	0	0	0	0	0
24–Systemic Toxicity	0	0	0	1	0	0	0	0	0	0	0	1
25–Disorders due to Physical Agents	0	0	0	0	0	0	0	0	0	0	0	0
26–Repetitive Trauma	2	0	0	0	2	0	2	0	0	0	6	0
29–Other Disorders	2	0	0	0	0	0	0	0	0	0	2	0
	4	0	0	1	2	0	2	0	0	0	8	1

Table 21. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for TAC.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21–Skin Disorders	2	11	1	4	5	6	3	4	1	0	12	25
22–Dust Disease of the Lungs	0	0	0	0	1	0	0	0	0	0	1	0
23–Respiratory Disorders	1	3	2	11	1	4	1	4	0	0	5	22
24–Systemic Toxicity	1	6	11	7	1	7	1	7	0	0	14	27
25–Disorders due to Physical Agents	0	11	1	7	0	21	2	11	0	0	3	50
26–Repetitive Trauma	9	1	4	1	8	1	8	0	1	0	30	3
29–Other Disorders	2	4	4	4	3	1	0	0	0	0	9	9
	15	36	23	34	19	40	15	26	2	0	74	136

Table 22. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for USAFA.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	2	0	0	0	1	0	0	0	0	0	3	0
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	0	0	1	0	0	0	0	0	0	0	1	0
24-Systemic Toxicity	0	0	0	1	0	0	1	0	0	0	1	1
25-Disorders due to Physical Agents	0	0	0	0	0	1	0	0	0	0	0	1
26-Repetitive Trauma	0	0	0	0	0	0	3	0	0	0	3	0
29-Other Disorders	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	1	1	1	1	4	0	0	0	8	2

Table 23. Reported Occupational Illnesses by OSHA Code, FY, and Personnel Component for USAFE.

OSHA Code	FY 1990		FY 1989		FY 1988		FY 1987		FY 1986		Total	
	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil	Civ	Mil
21-Skin Disorders	0	3	1	0	0	1	0	5	0	0	1	9
22-Dust Disease of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0
23-Respiratory Disorders	3	1	0	1	0	0	0	1	0	0	3	3
24-Systemic Toxicity	0	0	0	1	0	0	0	1	0	0	0	2
25-Disorders due to Physical Agents	0	0	0	0	0	1	0	0	0	0	0	1
26-Repetitive Trauma	0	1	0	0	1	0	0	1	0	0	1	2
29-Other Disorders	0	0	0	0	0	0	0	0	0	0	0	0
	3	5	1	2	1	2	0	8	0	0	5	17

V. GRAPHS OF SELECTED DATA.

Figures one through 18 include graphs of selected summary data.

Figure 1.

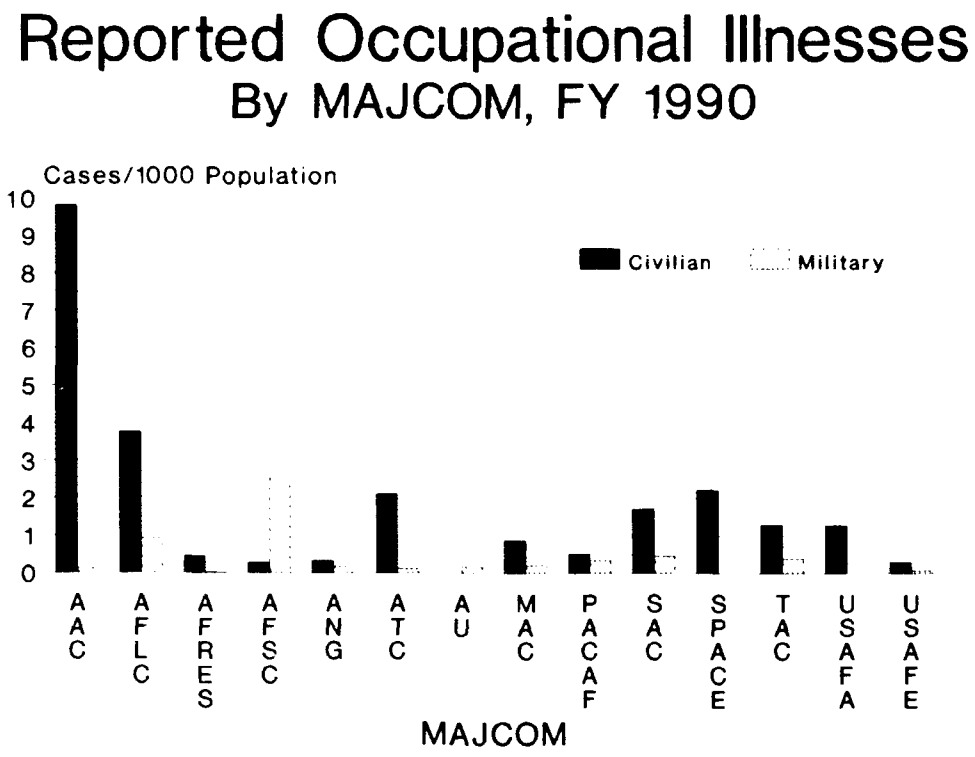


Figure 2.

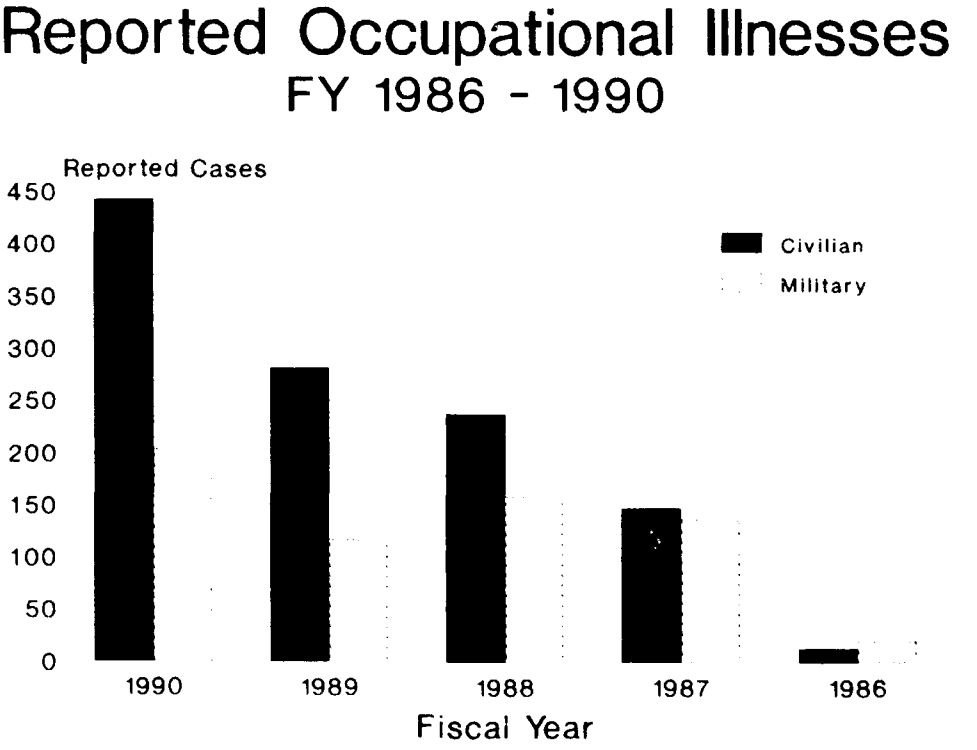
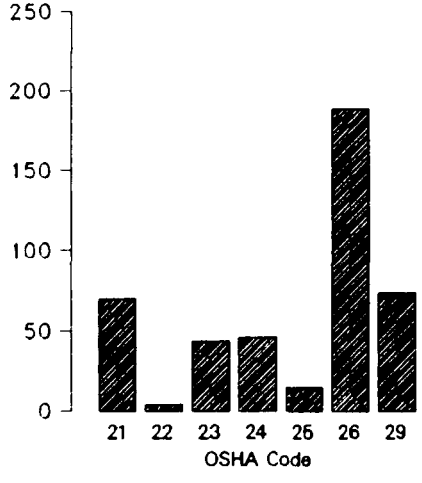


Figure 3.

Reported Civilian Occupational Illnesses
By OSHA Code, FY 1990



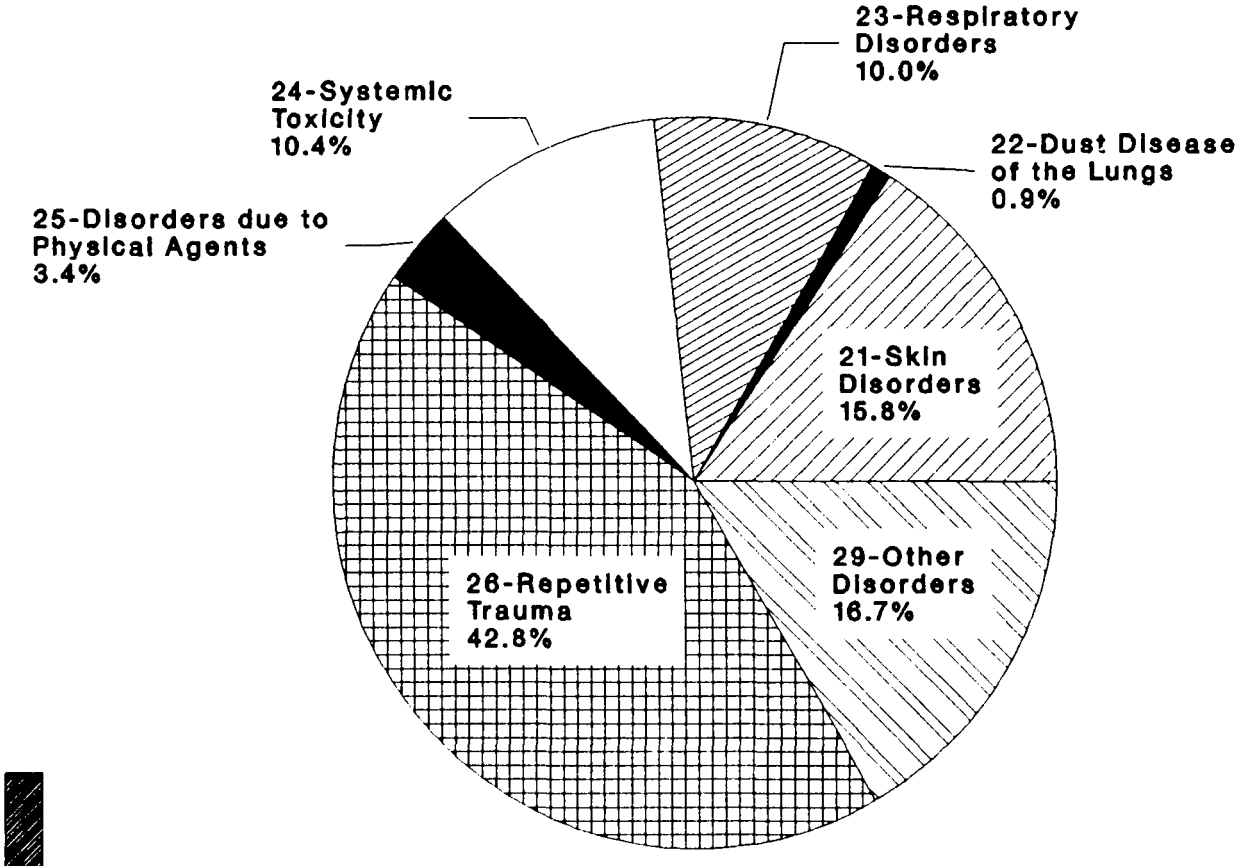


Figure 4.

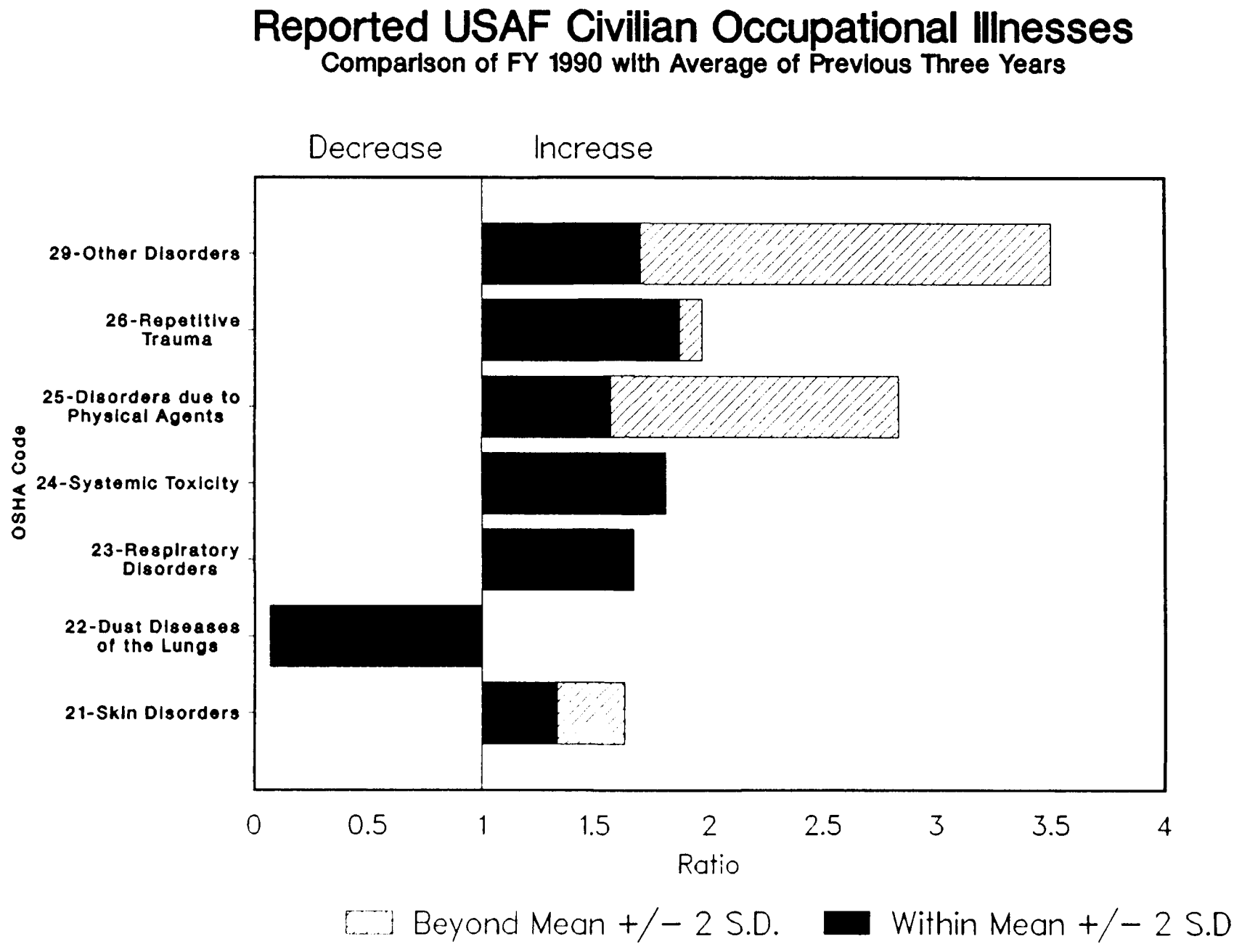
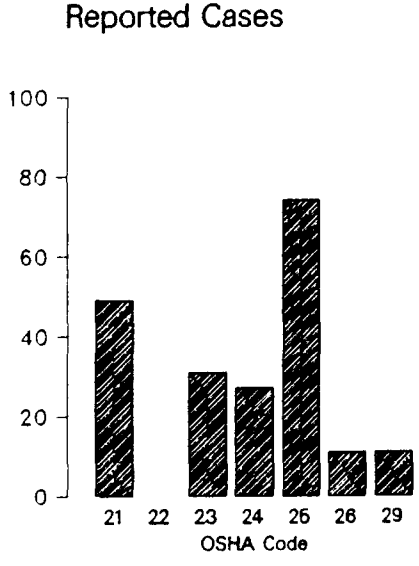

Reported USAF Civilian Occupational Illnesses
Comparison of FY 1990 with Average of Previous Three Years
Decrease
Increase
29-Other Disorders
26-Repetitive Trauma
25-Disorders due to Physical Agents
24-Systemic Toxicity
23-Respiratory Disorders
22-Dust Diseases of the Lungs
21-Skin Disorders
OSHA Code
0
0.5
1
1.5
2
2.5
3
3.5
4
Ratio
Beyond Mean +/- 2 S.D.
Within Mean +/- 2 S.D

Figure 5.

Reported Military Occupational Illnesses
By OSHA Code, FY 1990



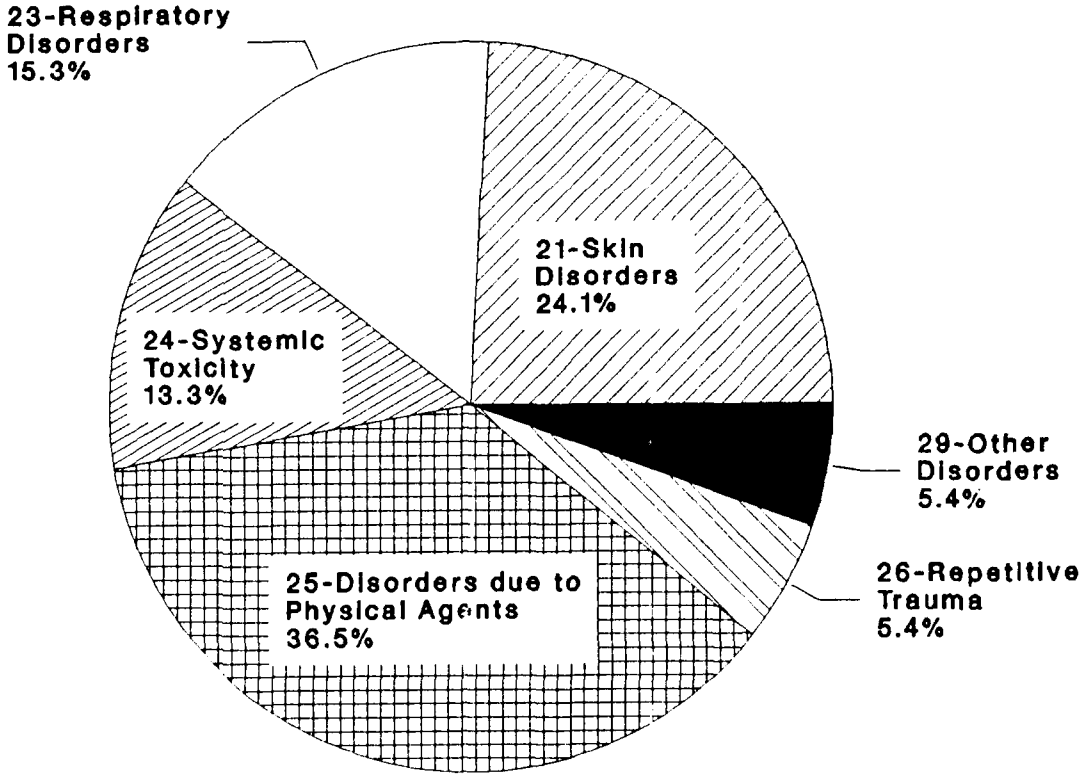


Figure 6.

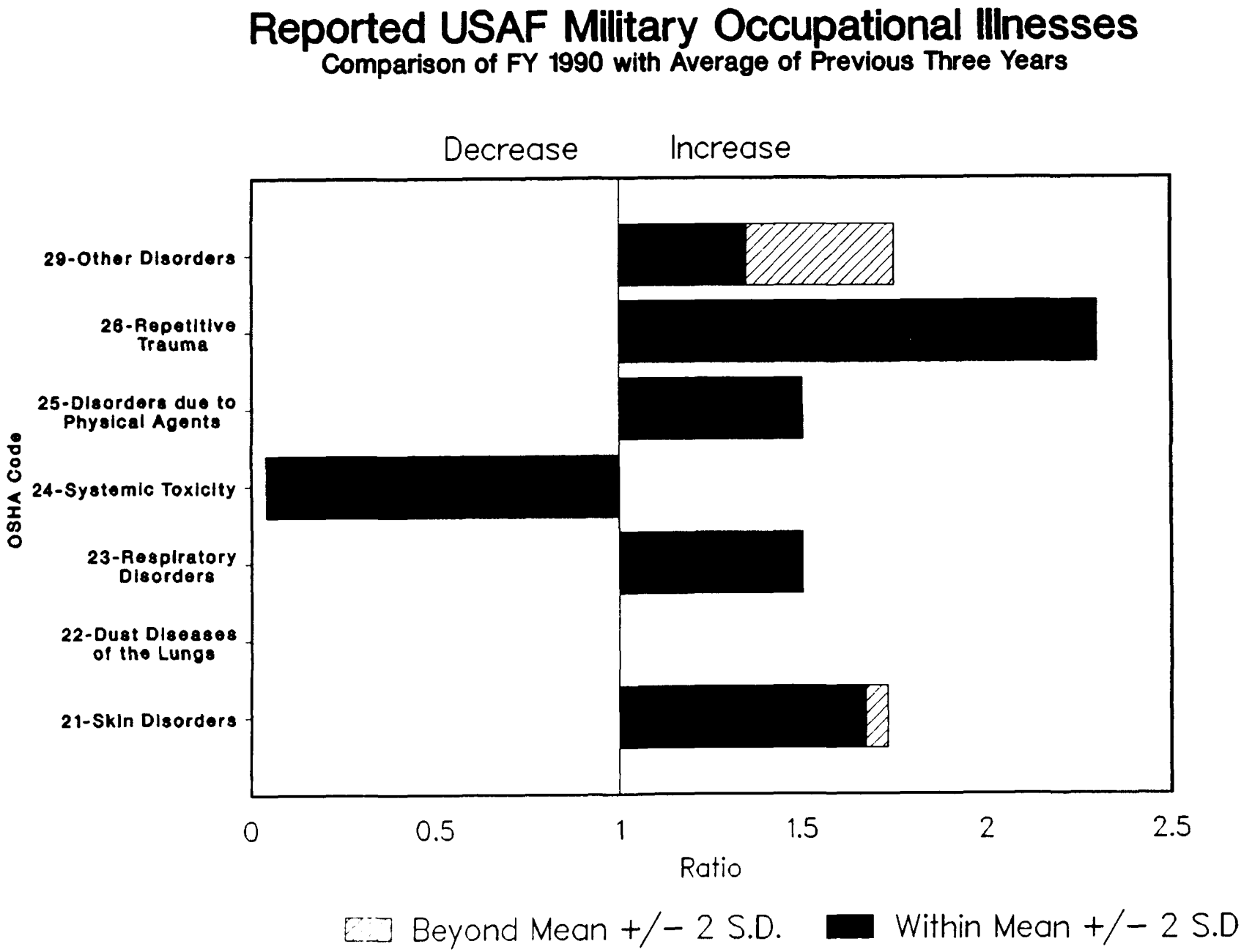

Reported USAF Military Occupational Illnesses
Comparison of FY 1990 with Average of Previous Three Years
Decrease
Increase
29-Other Disorders
26-Repetitive Trauma
25-Disorders due to Physical Agents
24-Systemic Toxicity
23-Respiratory Disorders
22-Dust Diseases of the Lungs
21-Skin Disorders
OSHA Code
0
0.5
1
1.5
2
2.5
Ratio
Beyond Mean +/- 2 S.D.
Within Mean +/- 2 S.D

Figure 7.

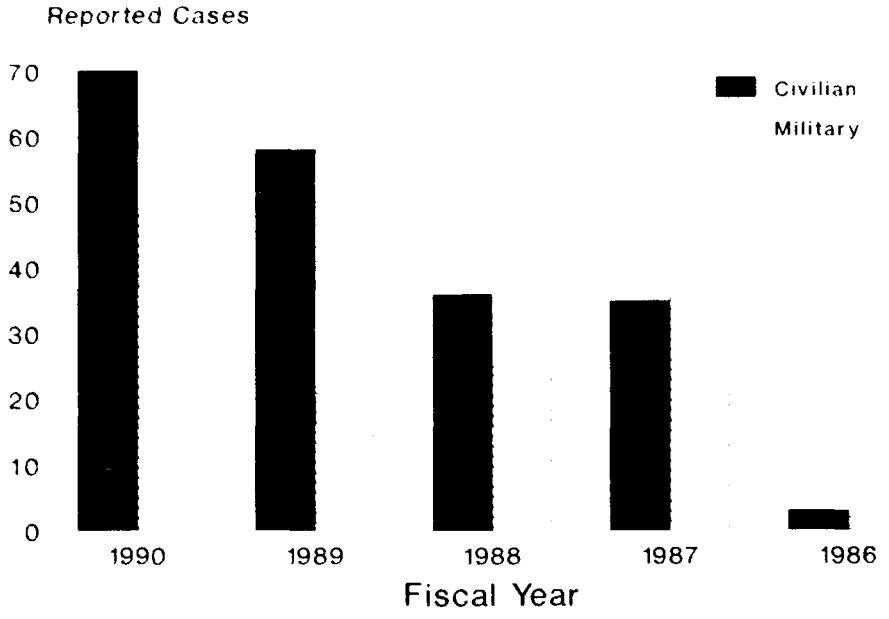


Figure 8.

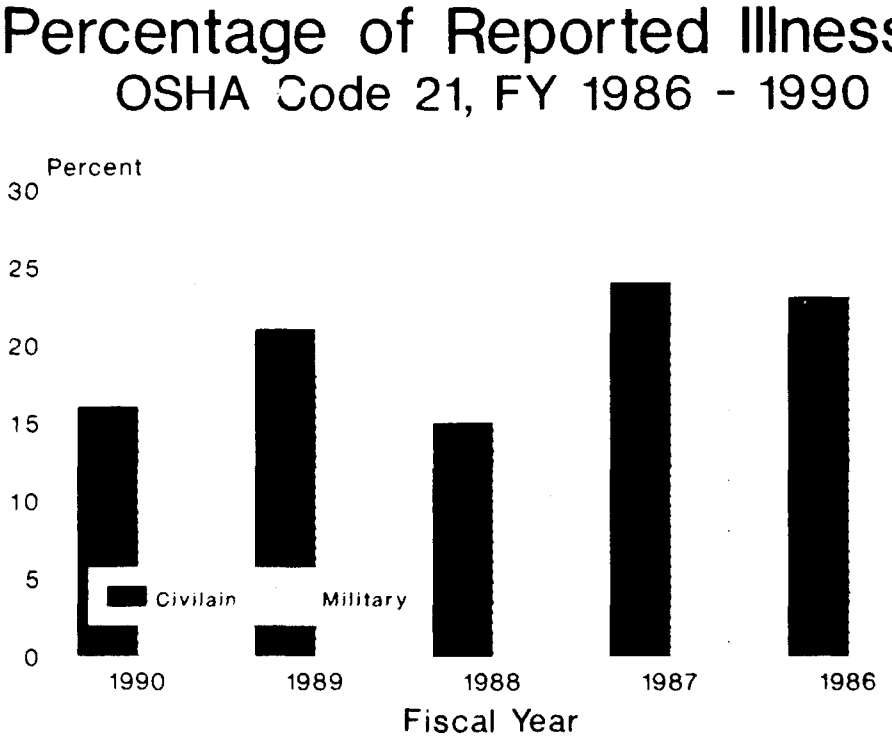


Figure 9.

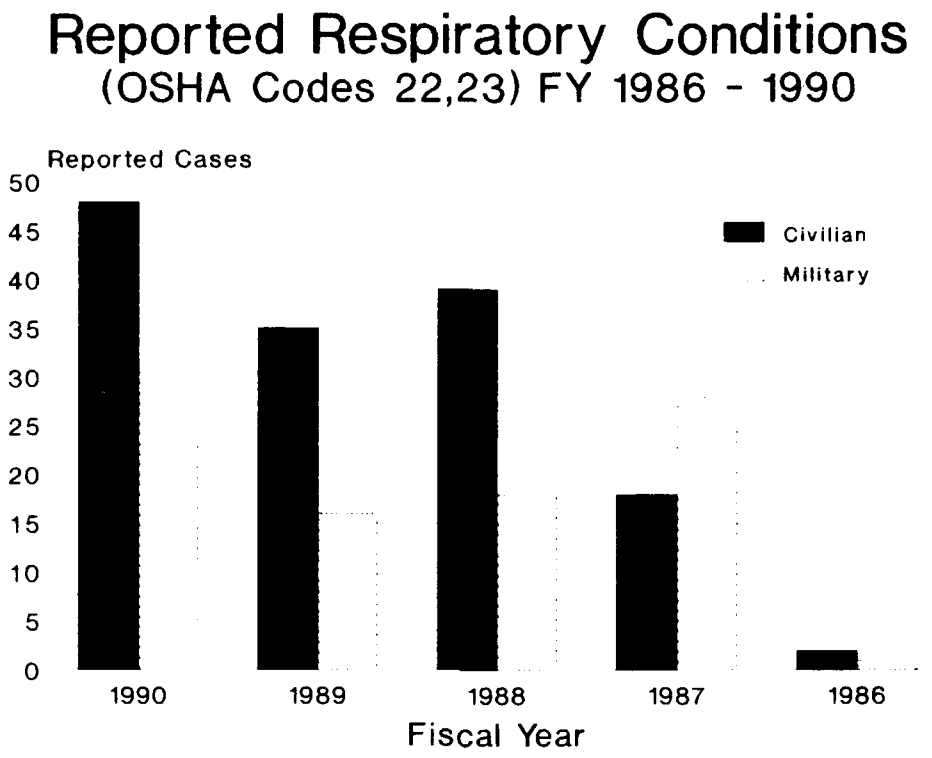


Figure 10.

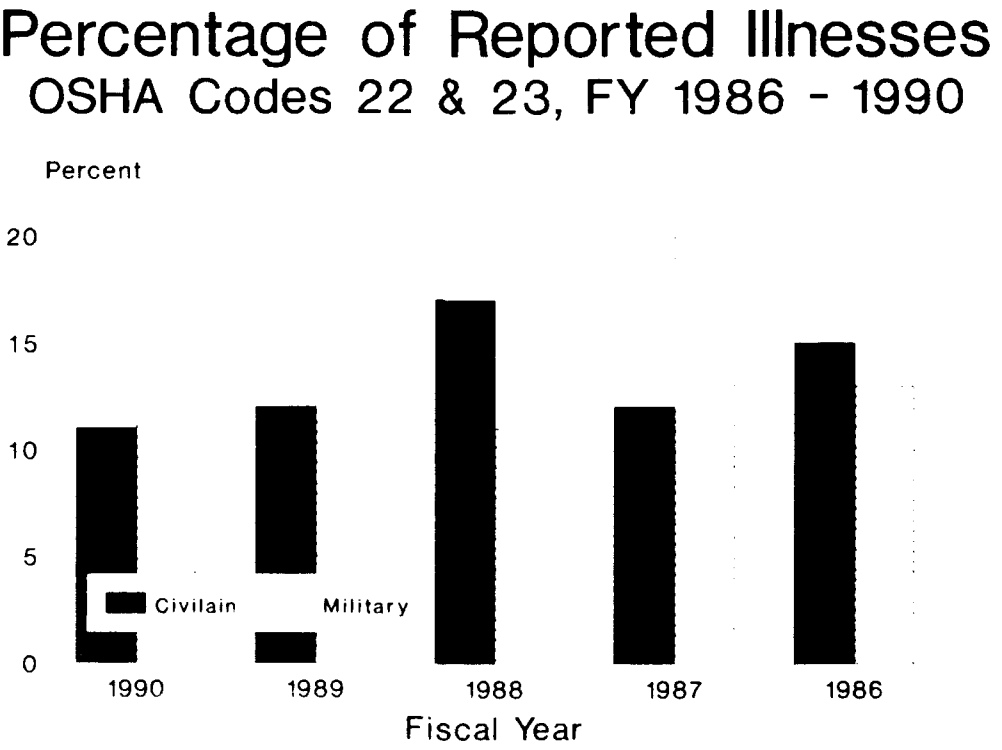


Figure 11.

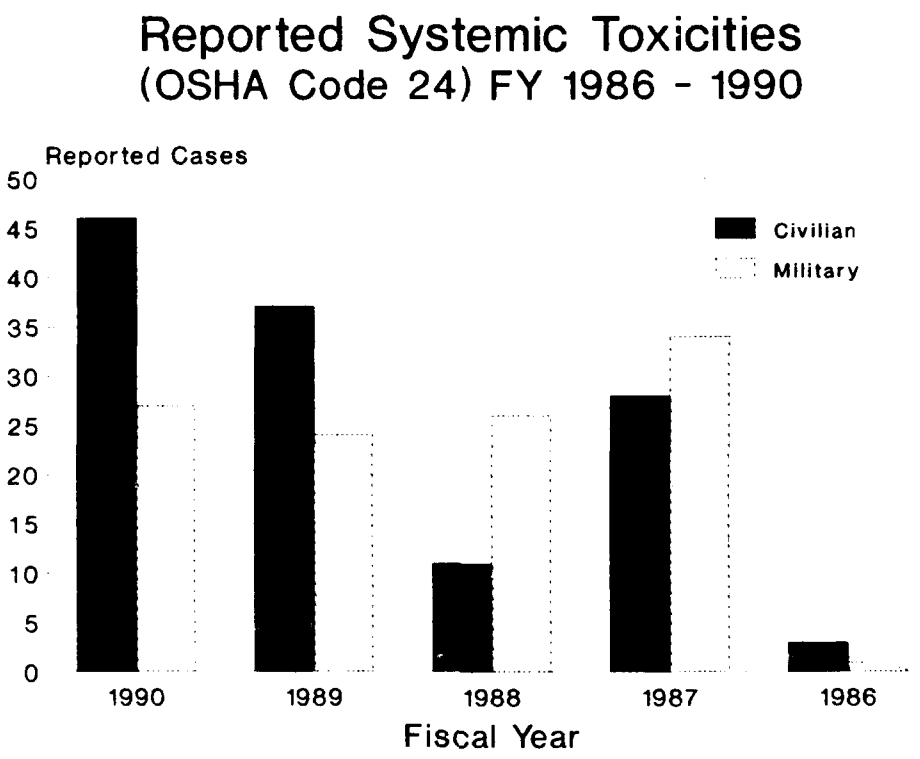


Figure 12.

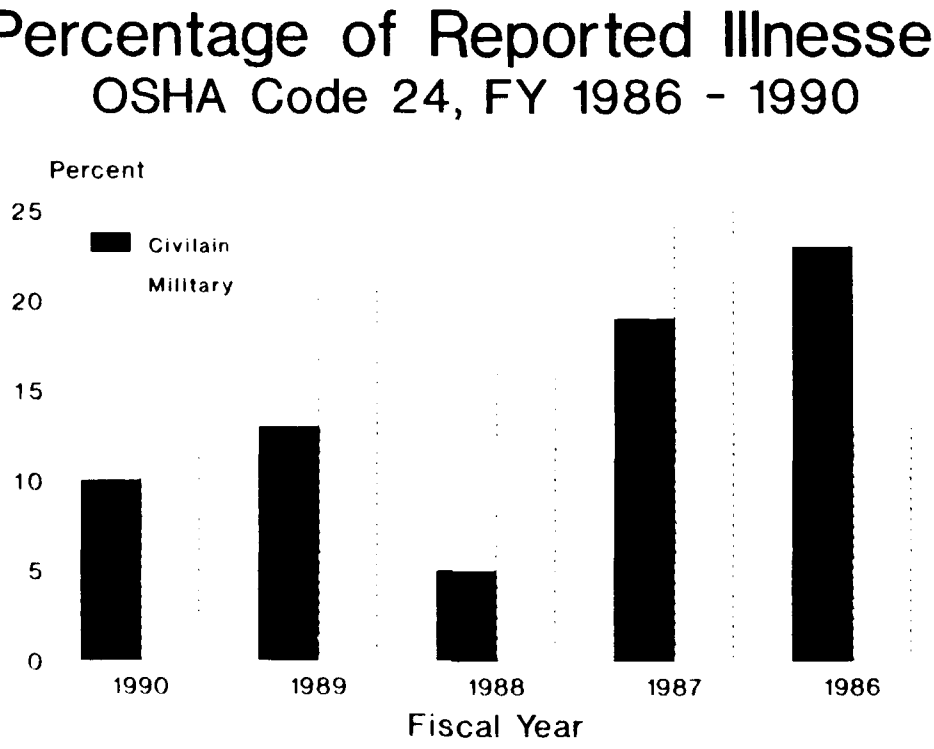


Figure 13.

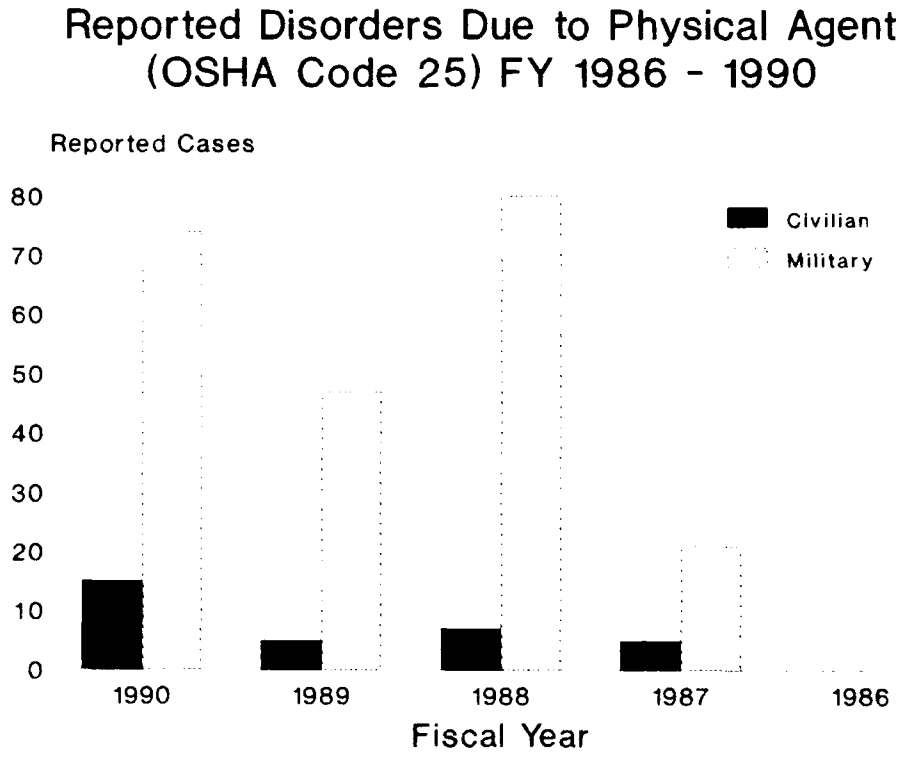


Figure 14.

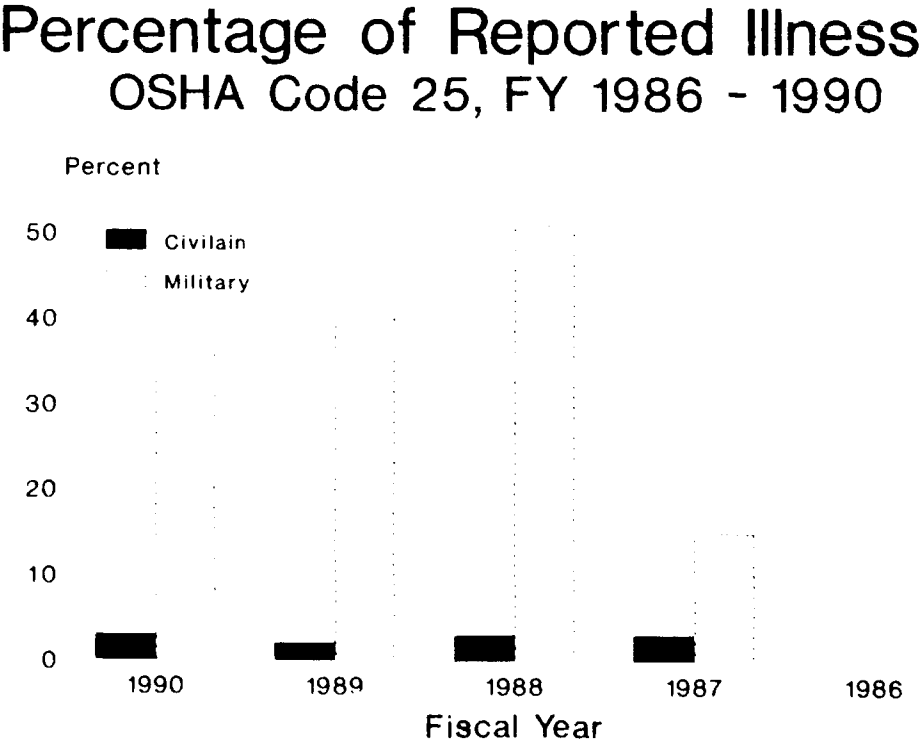


Figure 15.

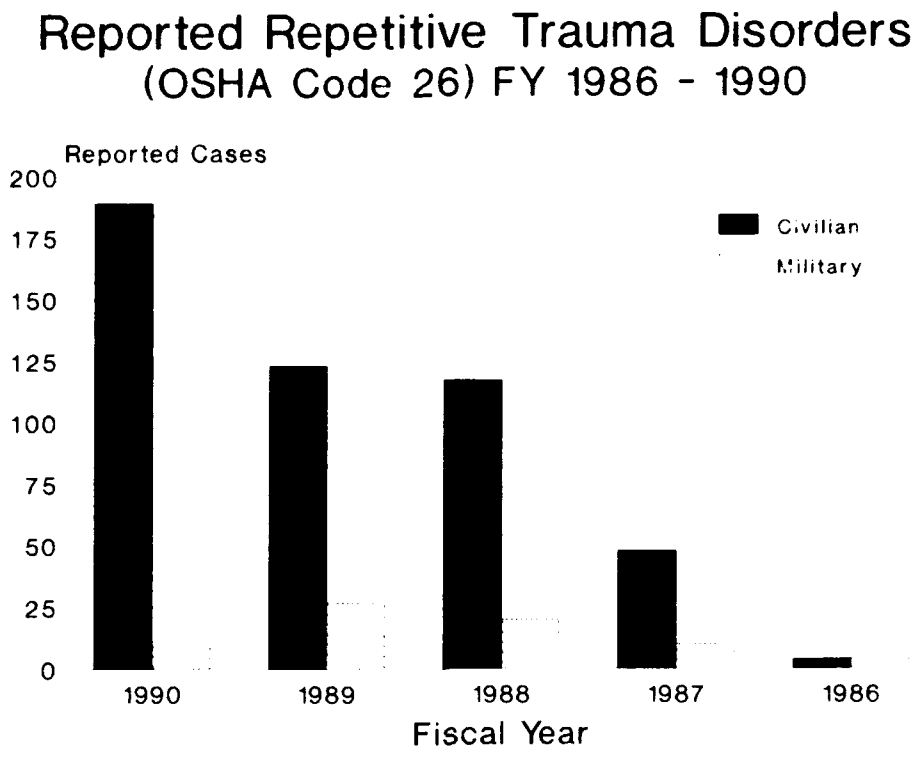


Figure 16.

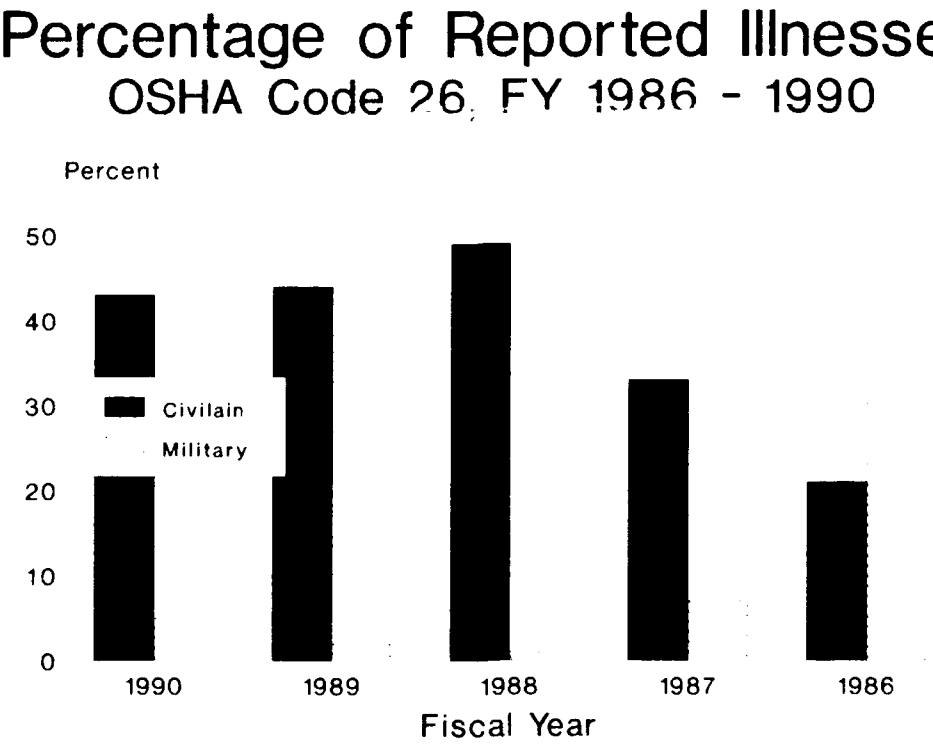


Figure 17.

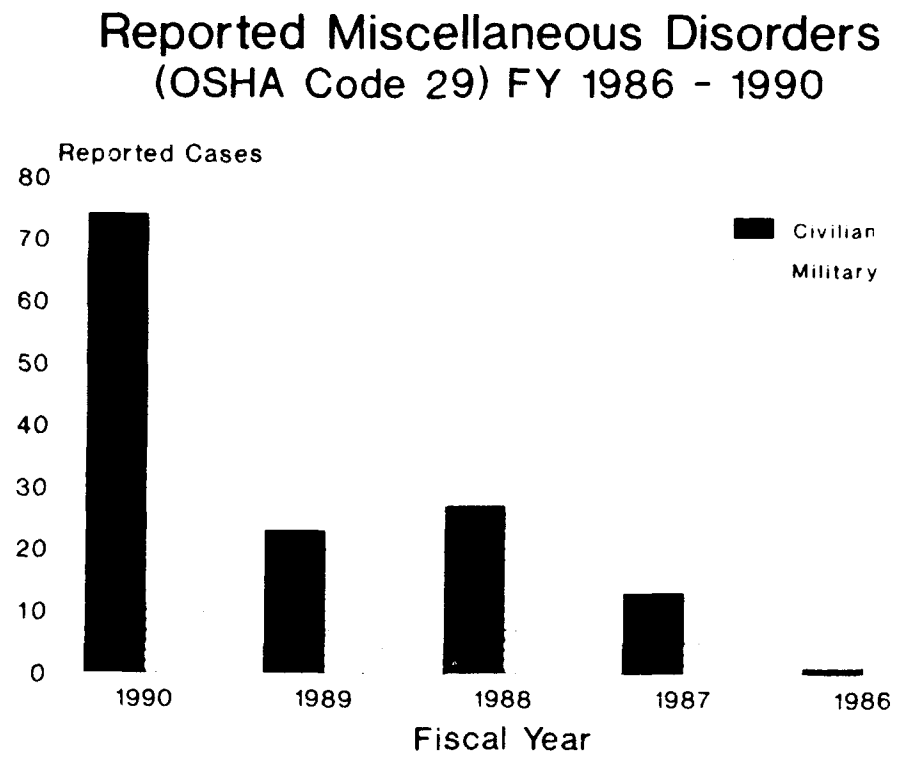
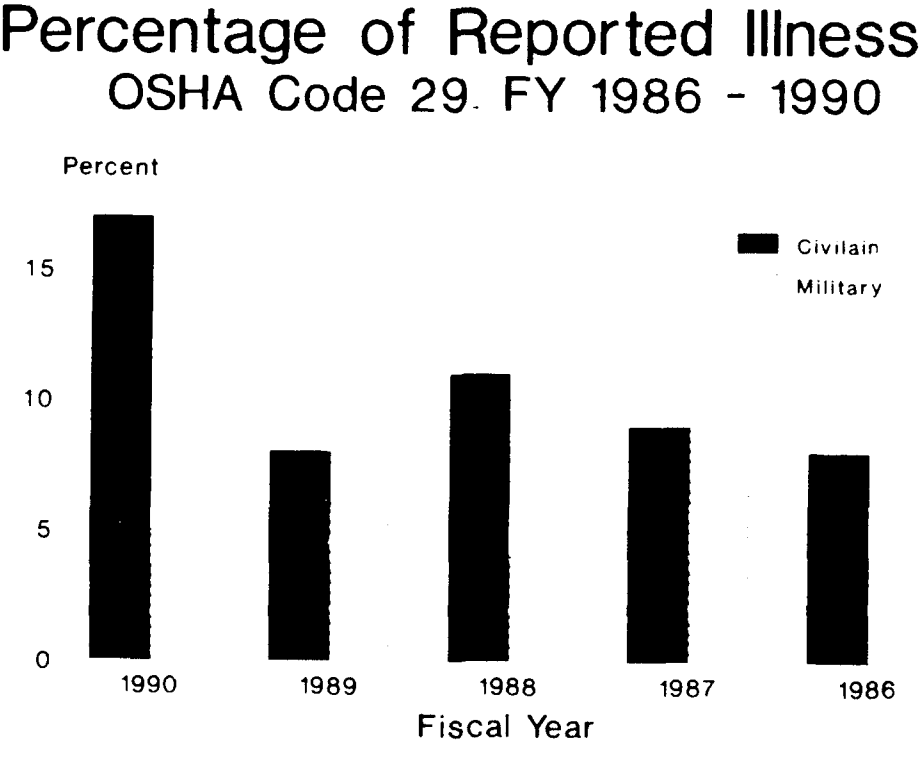


Figure 18.



VI. SPECIAL STUDY SUMMARIES.

A. Proportional morbidity study of USAF Occupational Illnesses, CY 1986 - 1988.

1. All occupational illness reports submitted by the Air Force between 1986 and 1988 were examined (N = 795). Sex, age, personnel category, employment code, OSHA code, exposure or hazard, and task performed were abstracted from each record. A diagnosis was assigned to each case according to the Ninth Revision of the International Classification of Diseases. The total numbers of illnesses were tabulated by OSHA code and personnel status into military and civilian cohorts. Comparisons between the two Air Force cohorts and the U.S. population were made using standardized proportionate morbidity ratios (SPMR). U.S. population figures were provided by the Bureau of Labor Statistics (BLS). The distributions of illnesses among military and Air Force civilian workers by OSHA code are presented in Tables 24 and 25. Since the overall proportions among AF civilians did not significantly differ from the BLS population, age and sex adjusted standardized morbidity ratio calculations between AF civilian and military members were possible. The results are shown in table 26.

Table 24. Observed and Expected Illnesses and SPMRs for Military Members of the United States Air Force, CY 1986 - 1988.

OSHA Code	Description	Obs[a]	Exp[b]	SPMR[c]	99% CL LL	99% CL UL	X^2
21	Skin Disorders	69	90	0.77	0.64	0.90	0.9
22	Dust Diseases of Lungs	0	5	0	---	---	---
23	Respiratory Problems	52	25	2.09	1.72	2.46	1.86
24	Systemic Intoxications	71	8	8.45	6.02	10.88	72.1§
25	Disorders Due To Physical Agents	115	24	4.73	3.72	5.74	21.9§
26	Repetitive Trauma Disorders	17	143	0.12	0.00	0.32	1.09
29	Other	15	42	0.36	0.04	0.68	0.49
		339					71.84§

[a]Obs, observed number of illnesses.
[b]Exp, expected number of illnesses, based upon BLS data.
[c]SPMR, OSHA Code Standardized Proportionate Morbidity Ratio,

$$\text{SPMR} = \frac{\text{Observed Number of Illnesses in OSHA Code Category}}{\text{Expected Number of Illnesses in OSHA Code Category}}$$

§ $p < 0.01$

2. The proportions of occupational illnesses among military members of the AF differed significantly from the U. S. population and from AF civilian workers. Systemic intoxications were found to be significantly elevated in both military and AF civilian cohorts when compared to BLS data. Following adjustments for age and sex differences between the military and AF civilian cohorts, the proportional excess of systemic toxicities among military personnel disappeared, as seen in table 26. Disorders due to physical agents (primarily heat stress) were significantly elevated in the military cohort when compared to both the civilian cohort and the U. S. population. This elevation was still present after indirectly standardizing the two cohorts on age and sex. This levation disappeared when heat stress cases arising during training for chemical warfare defense were discarded from the total. These results are useful for generating hypotheses for future study, however; it is impossible to estimate risk or calculate rates from these data.

Table 25. Observed and Expected Illnesses and SPMRs for Civilian Employees of the United States Air Force, CY 1986 - 1988.

OSHA Code	Description	Obs[a]	Exp[b]	SPMR[c]	99% CL LL	99% CL UL	χ^2
21	Skin Disorders	79	119	0.66	0.52	0.80	2.05
22	Dust Diseases of Lungs	11	7	1.60	0.84	2.36	0.37
23	Respiratory Problems	59	33	1.80	1.40	2.20	0.79
24	Systemic Intoxications	47	11	4.22	2.83	5.61	11.84[§]
25	Disorders Due To Physical Agents	13	33	0.40	0.00	0.75	0.40
26	Repetitive Trauma Disorders	203	196	1.03	1.00	1.06	0.004
29	Other	44	55	0.79	0.63	0.95	0.06
		456					11.89

[a]Obs, observed number of illnesses.
[b]Exp, expected number of illnesses, based upon BLS data.
[c]SPMR, OSHA Code Standardized Proportionate Morbidity Ratio,

$$\text{SPMR} = \frac{\text{Observed Number of Illnesses in OSHA Code Category}}{\text{Expected Number of Illnesses in OSHA Code Category}}$$

[§] $p < 0.01$

Table 26. Observed and Expected Illnesses and SMRs for Military Members of the United States Air Force, CY 1986 - 1988.

OSHA Code	Description	Obs[a]	Exp[b]	SMR[c]	99% CL LL	99% CL UL	χ^2
21	Skin Disorders	61	75.7	0.80	0.56	1.11	0.04
22	Dust Diseases of Lungs	0	10.4	0.00	--	--	--
23	Respiratory Problems	52	36.7	1.42	1.27	1.96	0.18
24	Systemic Intoxications	66	46.2	1.43	1.01	1.95	0.18
25	Disorders Due To Physical Agents	111	13.6	8.15	7.74	10.36	51.10[§]
26	Repetitive Trauma Disorders	17	96.7	0.18	0.12	0.33	0.67
29	Other	15	30.3	0.49	0.33	0.64	0.26
		322					52.45[§]

[a]Obs, observed number of illnesses.
[b]Exp, expected number of illnesses, based upon the AF civilian population.
[c]SMR, OSHA Code Standardized Morbidity Ratio,

$$SMR = \frac{\text{Observed}}{\text{Expected (Adjusted for Age and Sex)}}$$

[§] $p < 0.01$

B. Reported Cumulative Trauma Disorders Among AFCOMS Employees, CY 1986 - 1990.

1. HQ AFCOMS/SGPM requested information regarding repetitive trauma disorder reports among its employees.

2. A total of 28 occupational illness reports with a workplace function code of "CO", commissary, were found listed in the OIDR. Seventy-five percent, or 21, were OSHA Code 26, repetitive trauma disorders. Based upon data from the rest of the Air Force, only eight cases would be expected, a ratio of observed to expected of 2.57. This result was not statistically significant. Examination of work descriptions indicated the following:

a. Thirty-three percent were cashiers or checkers.

b. Thirty-three percent were meat cutters.

c. Thirty-three percent were warehouse workers or stockers.

C. Study of a Selected Population from Tinker AFB CY 1988 - 1990.

1. USAF Hospital Tinker/SGPO wanted information regarding occupational illness reports in a selected group of workers. They were able to provide

population at risk (denominator) data for the study group of 290 people, and the civilian population of Tinker AFB, approximately 17,500 people.

2. Cases entered in the OIDR from Tinker AFB with an organization code of "DA", depot aircraft maintenance; and one of the following function codes, "CC", corrosion control; "SR", structural repair; or "WR", washracks; provided the population at risk (PAR). Over the study period, the relative risk of reported occupational illness for Tinker AFB vs. other AFLC bases declined, a fact not indicated in table 27. Within Tinker's civilian population, the relative risk for "depot aircraft" workers remained high. When data were stratified by OSHA code, these workers were at especially increased risk for skin disorders, respiratory disorders, and systemic intoxications.

Table 27. Pooled Data from AFLC, CY 1988 - 1990.

	Cases	Non-Cases	Total (Person-Years)	Rate
Tinker AFB	206	52,294	52,500	0.0039
Other AFLC	412	250,337	250,749	0.0016
	618	302,631	303,249[Φ]	

Relative Risk (RR) = 2.44

Table 28. Pooled Data from Tinker AFB, CY 1988 - 1990.

	Cases	Non-Cases	Total (Person-Years)	Rate
Tinker AFB PAR	27	843	870	0.0310
Other Tinker AFB	179	51,451	51,630	0.0034
	206	52,294	52,500	

RR = 9.12

Table 29. Relative Risks by CY and OSHA Code for PAR vs. Other Tinker AFB Civilians.

	OSHA Codes						
Year	21	22	23	24	25	26	29
1988	14.8	0	73.9	58.6	0	10.4	0
1989	8.5	0	0	10.8	0	4.2	0
1990	20.0	0	58.0	119.0	0	0	10.0
Pooled	11.0	0	29.6	22.8	0	6.4	4.7

VII. DISCUSSION.

A. FY 1990 Data.

1. This year saw a sharp increase in reported occupational illnesses from the Air Force population over FY 1989, with case reports up 62 percent overall. Reports on military members were up 74 percent, civilians 57 percent. Increased numbers of illnesses may actually be occurring. However, it is more likely that reporting is improving. The advent of the OIDR, with changes in the reporting procedure may have been an influence.

a. Among cases reported for civilian personnel, statistically significant increases were apparent for OSHA codes 21, 25, 26, and 29. The increases in OSHA codes 26, repetitive trauma, and 29, other disorders, are not especially surprising, since there has been an increasing trend in these categories for several years. The increase in OSHA Code 25, disorders due to physical agents, is surprising. These cases are evenly distributed between cold stress, heat stress, and a single disorder due to radiofrequency radiation exposure. Although this year saw an increase in OSHA Code 25 reports for civilians, it is important to note that this category comprises only about three percent of all reports. Cases designated as OSHA code 22, dust disease of the lungs, continue to decline. The decrease this year was not statistically significant.

b. Case reports for military personnel revealed statistically significant increases in OSHA codes 21, skin disorders, and 29, other disorders. Cases reported in the code 29 category were truly "miscellaneous," with no apparent trends seen.

2. Reports are itemized by MAJCOM and personnel component in table 1. Since population data were available, the numbers of cases per thousand population were computed. Several commands are notable when examining these figures.

a. The case rate for AAC civilians was much higher than for any other command. The majority of this unexpected increase resulted from five

related cases among preschool teachers exposed to cleaning solvents used to clean carpeting.

b. Logistics command reported the next highest case rate for civilians. The majority of reports came from McClellan AFB, followed by Hill, Tinker, Wright-Patterson, and Robins. Kelly AFB only submitted one report. Among AFLC civilians, 62 percent of case reports where either OSHA Code 26, repetitive trauma disorders, or OSHA Code 29, miscellaneous disorders. The distribution of cases by ICD-9 code was interesting. Twenty cases of code 300, neurotic disorders, were reported. Forty-four cases were code 354.0, carpal tunnel syndrome, and 41 cases sustained code 388.12, noise-induced hearing loss.

c. Reports on Space Command civilians were elevated. Half of the reported cases were carpal tunnel syndrome.

d. ATC had a similarly high number of cases reported per 1000 civilian population. Fifty percent of the reports were filed by Lowry AFB. The distribution of reports by OSHA code from ATC bases was not unusual with the exception that all four cases of OSHA code 22, dust disease of the lungs, were contributed by this command. Two cases involved asbestos exposure, submitted by Chanute AFB, and two came from Lowry, with unknown dust exposures.

e. Reports per 1000 population submitted for military members during FY 1990 were unremarkable with the exception of the unusually high rate, 2.53 per 1000 population, reported by AFSC. Over eighty percent of these reports were submitted by Eglin AFB, 90 percent of which were OSHA code 25, disorders due to physical agents. On the whole, these were cases of heat stress, many among personnel TDY to Eglin from other locations.

3. AF Forms 190 submitted for civilian workers had one thing in common. The majority (62.7 %) contained no recognizable occupation codes. As shown in table 2, occupational illnesses among civilian workers were not confined to individuals from industrial shops. The group containing the most reports was mainly administrative in nature, followed closely by the most distinct occupational group in the table, sheetmetal mechanics. Admittedly, the "administrative" grouping is artificial, but their work and exposures are similar. Reports from the "administrative" group were not limited to white collar illnesses. Thirty-two percent of reports involved toxic effects of gases. Eleven percent of the case reports resulted from tight building investigations. Sheetmetal mechanics were frequently reported with carpal tunnel syndrome and noise-induced hearing loss, 33 percent and 22 percent respectively. This finding isn't too surprising considering the nature of their work. The numbers of cases per unit population were not calculated for civilian workers, as population figures are not readily available for this group. Data for NAF and foreign national personnel are especially difficult to obtain.

4. Occupation code reporting was much more complete for military members (81 %). The numbers of cases per thousand population in each AFSC were computed since denominator data was available. Among Air Force officers, disaster preparedness personnel experienced 6 cases per 1000, but with a population of 167, any single case will have a disproportionate impact. Among enlisted personnel, the highest reporting rates were seen in the fire protection, sanitation, instrumentation, dental, and structures & pavements career fields. These results are notable in that they do not come from

predominantly industrial activities. Among the distinctly industrial population, manned aerospace workers reported the most cases. Forty-one percent and twenty-three percent of these cases resulted from skin disorders, such as eczema, and respiratory disorders, such as difficulty breathing, respectively.

5. Examination of case reports by ICD-9 code was enlightening. Thirty-three percent of civilian reports were classified as repetitive trauma disorders (Codes 354, 388, and 726). Among the military population heat stress was by far the most common disorder reported (33 %). Both civilians and military had high proportions of illness due to ICD-9 codes 987 and 692, toxic effects of gases, fumes, and vapors, and contact dermatitis. These results are similar to OSHA data, suggesting how universal these problems are.

B. Historical Review.

1. AFLC has reported over half of the civilian occupational illnesses registered since 1986. Just under half of these reports have been OSHA Code 26, repetitive trauma disorders (RTD). This group of illnesses can be more difficult to document than others, since symptoms are often subtle, and extensive workups may be required to arrive at a diagnosis. The presence of occupational medicine clinics at each AFLC facility may account for the high number of RTDs reported from AFLC bases. Similarly, awareness of occupational illness is probably higher at these facilities due to their extensive surveillance and education programs.

2. Over the period covered by this report, some changes in the proportion of illnesses assigned to each OSHA Code have occurred. The percentage of cases recorded as OSHA Code 21, skin disorders, has remained relatively constant, although civilian reports indicate a gradually increasing trend. On average about 20 percent of reports concern skin disorders each year. The proportion of cases recorded as OSHA Code 22 and 23, dust diseases of the lungs, and respiratory effects of toxic chemicals, has also remained constant at about 13 percent of total case reports. Reports on military personnel reveal a slight decrease historically. Reports of systemic toxicity, OSHA Code 24, have shown no distinct trends. Reported heat stress cases, recorded as OSHA Code 25, disorders due to physical agents, have decreased among the military population, and are currently averaging 30 percent of case reports. Civilian case reports in this category have remained relatively stable. Recorded repetitive trauma disorders, OSHA Code 26, have risen linearly each year for military, and have remained stable over the past two years for civilians. Reports of miscellaneous disorders, OSHA Code 29, have more than doubled over the past five years. Civilian case reports have increased linearly, with the exception of a dip in 1989. Military case reports have varied somewhat, without an apparant trend revealing itself. Mainly, increases in this category have been due to neurotic disorders and stress related problems.

VIII. SUMMARY

A. Several trends are apparent. Occupational illness reporting has improved significantly over the past five years. This effect is most likely due to efforts on the part of personnel in the field rather than a substantial increase in occupational illnesses. Underreporting is probably still common. Studies to determine the exact level of underreporting are needed.

B. Misreporting is also common. Injuries are often reported as illnesses. Recorded OSHA Codes are at times incorrect. Most forms are incomplete. The majority of reports for civilian workers contain no occupation codes. Few AF Forms 190 contain accurate information on days of work lost or days of restricted duty. A new, improved AF Form 190, incorporating better coding schemes and explicit instructions, is needed.

C. Occupational illnesses are not limited to the industrial sector. Clearly, administrative workers are at risk for occupational illnesses. Their illnesses are also not limited to "white collar" disorders.

D. In previous years, civilian personnel have experienced high amounts of systemic toxicities. The proportions of "poisoning cases" have fallen in recent years, to be replaced by repetitive trauma disorders and miscellaneous disorders. Similar trends are appearing in BLS statistics. We can expect these trends to continue.

E. Systemic toxicities have been a common problem among military personnel in the past, although the proportions have not been significant when compared with Air Force civilian workers. Heat stress has been, and continues to be, the single most important cause of occupational illnesses among military members of the Air Force.

F. The Tinker AFB study illustrates the potential of the OIDR when adequate population data are available. Most registries are limited to descriptive studies which suggest further avenues for study. This has been the most common outcome when studies using OIDR data are accomplished. However, analytical research is possible when accurate denominator data are made available. Risk estimates then become possible.

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